Space Weather Forecast

Issued on Friday, 31 March 2023 at 00:30 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Chance of both Minor Radio Blackouts and Minor Geomagnetic Storms.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate over the past 24 hours, with a Moderate class flare at 30/0737UTC from AR3256. This region was the largest and most active on the visible disc, but is now very close to the western limb and has rapidly decayed. A resulting Coronal Mass Ejection (CME) was analysed and misses Earth. The remaining five numbered regions are much smaller and simpler, showing only slight changes.

A small CME from near the solar equator around 40W at 30/0720UTC has been analysed and is not considered to be Earth directed. A previous CME, which was emitted from a prominence eruption on the southeast limb around 29/1200 UTC, has been re-analysed. There is now a low confidence potential glancing blow to Earth early on the 3rd April.

Solar Wind / Geomagnetic Activity: The solar wind was at slightly elevated speeds, then increased early afternoon to become elevated, peaking at 592 km/s at 30/2027 UTC. The strength of the magnetic field was predominantly weak, but occasional touched moderate levels. The important north-south component was mostly weakly negative.
The net result was for Quiet to Unsettled geomagnetic activity, with one isolated Minor Storm period 30/1800-2100 UTC.

Energetic Particles / Solar Radiation: A slight high energy proton enhancement was visible at GOES16 as a result of the Moderate class flare, but remained well below the S1 (Minor) radiation storm level. After this the high energy protons declined, ending background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity carries an initial Chance of further M-class flares in the next 24 hours or so, most likely from AR3256 approaching the southwest limb. The risk of further such events then declines as the region rotates further away behind the west limb. Returning regions are expected to rotate onto the visible disc from the farside, and they may cause the probabilities of significant flares to be increased slightly later in the forecast period.

Solar Wind / Geomagnetic Activity: No Earth-directed CMEs currently feature in the forecast, apart for a low confidence glancing blow from a CME early on the 3rd April. Earth is currently within an enhanced solar wind, due to a coronal hole feature, with elevated speeds. The solar wind is expected to remain at elevated levels until late day 3 (2nd), then decline to become slightly elevated. Geomagnetic activity is expected to be mainly Unsettled to Active today and tomorrow (31st and 1st), with a chance of isolated Minor geomagnetic storm intervals.

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After this a decline to Quiet to Unsettled conditions are expected, with only a chance of Active intervals early on the 3rd with the potential CME arrival.

Energetic Particles / Solar Radiation: High energy proton flux carries a Slight Chance of breaching S1 given the slight enhancement yesterday, and the prospect of the active region responsible remaining in a geoeffective location for the start of the forecast period.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	50	20	10	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	25	15	5	1
Very Active	R3 to R5 X	No	10	5	1	1

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Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	10	5	1
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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